GENERIC NAME: **MAGNESIUM SULFATE**
112.17

BRAND NAME: Magnesium Sulfate
CLASS: electrolyte, tocolytic

Mechanism of Action:

Pharmacology: Second most plentiful intracellular cation; essential to enhance intracellular potassium replenishment and activity of many enzymes; important role in neurochemical transmission and muscular excitability (may decrease acetylcholine released by nerve impulses); decreases myocardial irritability and neuromuscular irritability.
Clinical: Cardiac-reduces ventricular irritability, especially when associated with hypomagnesemia; inhibition of muscular excitability.

Indications and Field Use:

Torsade de pointes, drug of choice
VF/Pulseless VT refractory to lidocaine and/or bretylium
Hypomagnesemia
> Pre-term labor (PTL)
> Pregnancy-induced hypertension (PIH, toxemia of pregnancy, pre-eclampsia and/or eclampsia).

Contraindications:

Hypermagnesemia
Use cautiously in patients with impaired renal function and pre-existing heart blocks (relative).

Adverse Reactions:

Cardiovascular: hypotension (may be transient), flushing circulatory collapse, depressed cardiac function, heart block, asystole, smooth muscle relaxant (antihypertensive effects).
Respiratory: respiratory depression and/or paralysis may occur in both mother and/or infant during or up to 24 hours after the administration of $MgSO_4$.
CNS: sweating, drowsiness, hypothermia, depressed reflexes progressing to flaccidity and paralysis which may occur in both mother and/or infant during the administration of or up to 24 hours after the administration of $MgSO_4$.
GI: nausea
GU: mild diuretic
Metabolic: hypocalcemia, hypermagnesemia

NOTES ON ADMINISTRATION

Incompatibilities/Drug Interactions:

Concurrent digilization increases danger of dysrhythmias

Adult Dosage:

VF/Pulseless VT: 1-2 Gms IV in 1-2 minutes or dilute 1-2 Gms in 100 ml NS administered over 1-2 minutes.
Torsade de pointes: 1-2 Gms over 1-2 minutes or dilute 1-2 Gms in 100 ml NS administered over 1-2 minutes followed by the same amount infused over 1 hour.
Hypomagnesemia: Dilute 1-2 Gms in 50-100 ml NS administered IV push over 5-60 minutes.

> **Pre-term labor (PTL):** Initial bolus (Field and Interfacility): 4-6 Gm over 15-20 minutes (Suggested method is the addition of 4 Gms to 100 ml D_5W, LR or NS. Resultant concentration is 40 mg/ml) Maintenance Infusion (Interfacility only): 1-4 Gms/hour infusion rate. Suggested method for treatment of premature labor is to follow initial bolus with infusion of 2 Gms/hr which may be continued until uterine contractions are reduced to < 1 every 10 minutes. Then, infusion is decreased to 1 Gm/hr and continued for 24-72 hrs. One method for mixing infusion is the addition of 40 Gms to 1000 ml LR. Resultant concentration equals 40 mg/ml. If this concentration is run at 50 ml/hr, $MgSO_4$ delivered equals 2 Gms/hr).

> **Pregnancy induced hypertension, preeclampsia/eclampsia, (PIH):** Initial bolus (Field and Interfacility): 3-6 Gm over 10-15 minutes (Suggested method is the addition of 4 Gms to 100 ml D_5W, LR or NS. Resultant concentration is 40 mg/ml). Maintenance Infusion (Interfacility only): Follow bolus with 1-3 Gms/hour infusion rate. (Same mixture as for PTL). Rebolus: In an eclamptic emergency may rebolus with $MgSO_4$, 2-4 Gms depending on patient size (mixed as in initial bolus) over 10-15 minutes if DTRs 2+ or higher, respirations >12/minute and urine output >30 ml/hr.

Routes of Administration:

IV PUSH, IV infusion bolus and IV infusion

Onset of Action:

Seconds

Peak Effects:

Not known

Duration of Action:

24 hours or greater

Dosage Forms/Packaging:

1 Gm/2 cc vials (0.5 Gm/cc)
5 Gm/10 cc vials (0.5 Gm/cc)

Arizona Drug Box Supply Range:

PARAMEDIC and QUALIFIED IEMT:	4 - 10 1 gm/2 ml vials
INTERMEDIATE:	0

Special Notes:

> O_2 should be administered to patients receiving $MgSO_4$.
> For OB emergencies maintenance infusions of $MgSO_4$ should be administered by infusion pump to prevent toxicity. Therefore, loading bolus therapy only, using a minimum of microdrip tubing, is recommended for field to hospital intervention for OB indications. Interfacility transfers may include a loading dose followed by a maintenance infusion of $MgSO_4$ which requires an infusion pump.
> Transport gravid patients lying or tilted to left side to prevent restricting venous return to heart.
> Use cautiously in patients with impaired renal function, pre-existing heart blocks and women in labor.
> Keep calcium chloride (10%) 10 ml available to reverse magnesium toxicity. See: CaCl profile
> Monitor vital signs every 15 minutes and DTR's hourly in patients receiving $MgSO_4$ infusion. If DTR's are absent or respirations <12/min, discontinue $MgSO_4$ infusion, notify medical control.
> Hourly intake and output should be monitored on long transport; urine output should be >30 cc/hr.
> When given to toxemic mothers within 24 hours before delivery observe newborn for S/S of $MgSO_4$ toxicity (neuromuscular and/or respiratory depression).
> Additional high risk perinatal consultation is available through: Tucson Area 1-800-852-6616 or Phoenix Area 1-800-552-5252.
> Interfacility maternal transport teams are recommended and available for the transport of patients requiring continuous IV infusions of $MgSO_4$.
> In treatment of seizures associated with PIH it may be necessary to use an anticonvulsant such as diazepam.